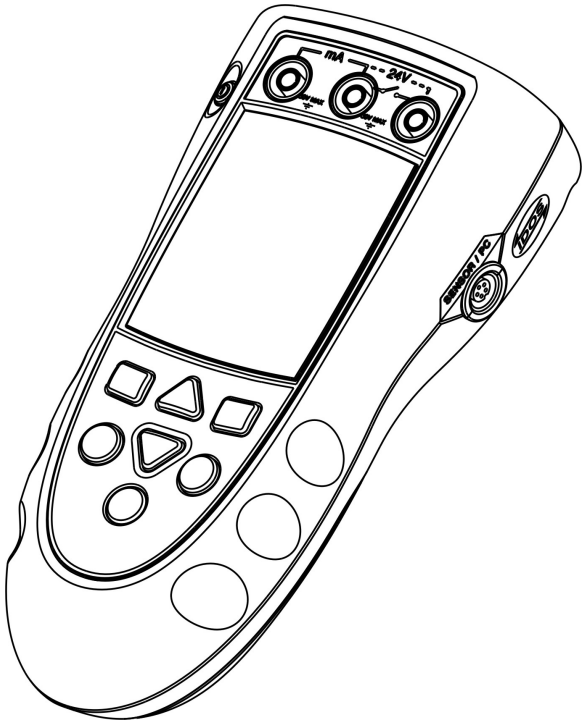
GE Infrastructure
Sensing

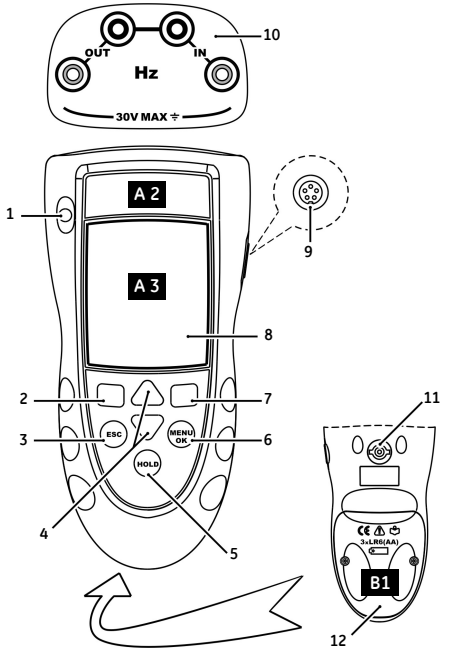
Druck DPI 841/842

Frequency calibrator and
Frequency loop calibrator

User manual - K395

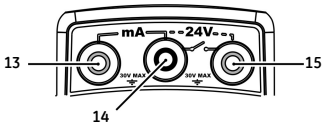


A1

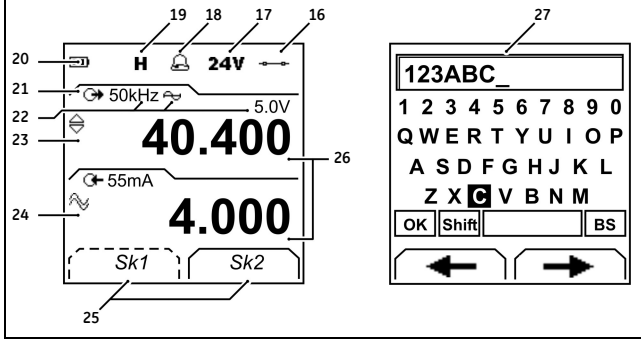


A2

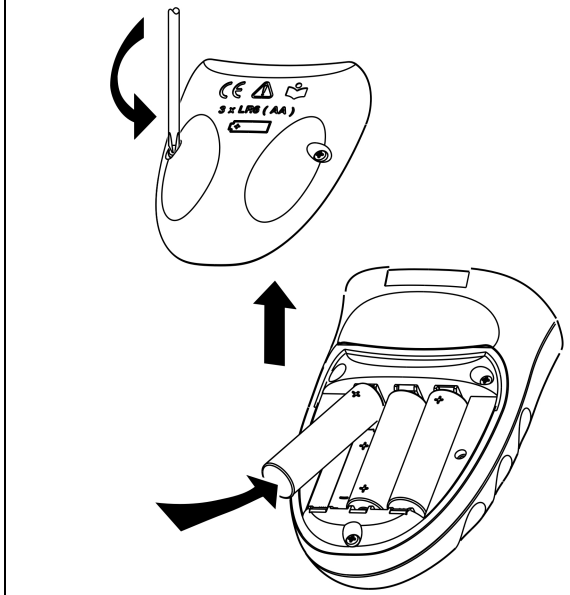
DPI 842



A3



B1



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Introduction

The DPI 841 Frequency Calibrator and DPI 842 Frequency Loop Calibrator are part of the Druck DPI 800 series of hand held instruments.

The DPI 800 series uses Intelligent Digital Output Sensor (IDOS) technology to give instant plug and play functionality with a range of Universal Measurement Modules (UMM). Example: the Universal Pressure Module (UPM).

The DPI 841/842 include these functions:

Function	DPI 841	DPI 842
Measure/supply a frequency or a pulse count.	* Yes	
Step/Ramp functions	Automatic/Manual	
Communications port	IDOS or RS232	
Language selection	Yes	
Measure pressure/Leak test	** External IDOS UPM	
** Snapshot	Up to 1000 displays with a date/time stamp	
Measure mA	No	0 - 55 mA
HART® resistor	No	Yes
V dc output	No	24 V
Switch test	No	Yes
Other functions	Hold, Maximum/Minimum/Average, Filter, Tare, Scaled values, Backlight, Alarm	

* *Refer to "Specification data".*

** *Optional item*

Safety

Before you use the instrument, make sure that you read and understand all the related data. This includes: all local safety procedures, the instructions for the UMM (if applicable), and this publication.

WARNING

- **It is dangerous to ignore the specified limits for the instrument or to use the instrument when it is not in its normal condition. Use the applicable protection and obey all safety precautions.**
- **Do not use the instrument in locations with explosive gas, vapor or dust. There is a risk of an explosion.**

Continued

Safety (Continued)

- **To prevent electrical shocks or damage to the instrument, do not connect more than 30V between the terminals, or between the terminals and the ground (earth).**
- **UPM only. To prevent a dangerous release of pressure, isolate and bleed the system before you disconnect a pressure connection.**

Before you start an operation or procedure in this publication, make sure that you have the necessary skills (if necessary, with qualifications from an approved training establishment). Follow good engineering practice at all times.

Safety - Marks and symbols on the instrument

CE	Complies with European Union directives	⚠	Warning - refer to the manual
📖	Read the manual	▭	Battery
⏚	Ground (Earth)	⏻	ON/OFF

To start

To start - Location of items A1 ... A2

Item		Description
1.	❍	On or off button.
2.	▀ ▄	Left-hand soft-key. Selects the function above it on the display (Item 25). Example: Edit
3.	**ESC**	Moves back one menu level. Leaves a menu option. Cancels the changes to a value.
4.	▲ ▼	Increases or decreases a value. Highlights a different item.
5.	**HOLD**	Holds the data on the display. To continue, press the **HOLD** button again.
6.	**MENU** **OK**	Shows the *Select Task* menu. Selects or accepts an item or value. Selects [✓] or cancels [ ] a selection.
7.	▀ ▄	Right-hand soft-key. Selects the function above it on the display (Item 25). Example: Settings
8.		Display. Refer to A3
9.	**SENSOR / PC**	Communications port. Use to connect a Universal Measurement Module (UMM) or a RS232 cable.
10.	**IN** **OUT**	Terminals to measure (IN) or supply (OUT) a frequency or a pulse rate. Refer to "Operation".
11.		Connection point for some of the optional accessories. Refer to the datasheet.
12.		Battery compartment. Refer to B1.
13., 14., 15.		DPI 842 only. Terminals to measure current, to supply 24V source, and to do switch tests.

To start - Items on the display A3

Item		Description
16.	⊶	DPI 842 only. Task indication for the switch test. ⊶ = switch closed ⊶ = switch open UPM only. Task indication for the leak test. *Refer to: Select Task (Table 2/3)*
17.	**24V**	DPI 842 only. The loop power supply is on. *Refer to: Select Task (Table 2/3)*
18.	🔔	The measured value satisfies one of the alarm conditions. *Refer to: Settings (Table 4)*
19.	**H**	The data on the display is on hold. To continue, press the **HOLD** button again.
20.	▭	Shows the battery level: 0 ... 100%.
21.	⊶	Identifies the type of data and the measurement range. ⊶ = Input ⊶ = Output ⊶ = IDOS input *Refer to: Select Task (Table 2/3)*
22. ... 24.		The settings applied to the input or output.
22.	**kHz**	The units or a specified scale (x:y) - (Table 4/5)
	∿ , ⊓ , ∿	= Output waveform (Table 5)
	5.0V	**...V** The input trigger level (Table 4) or the output amplitude (Table 5).
23.	◈	, ... , = Output operation (Table 5)
24.	∿	= Filter ▲ = Maximum ⧖ = Average (Table 4) **T** = Tare ▼ = Minimum
25.		A soft-key function. To select an available function, press the soft-key below it. Example: ◀ = Move left ▶ = Move right
26.		The measured value or values applicable to the task selection.
27.		The *Edit* display to set up text labels (≤ 6 characters): *x:y Scaling (Table 4).* **OK** = Accept the new text label **Shift** = Change the keys: 123ABC or -_+abc ▭ = Add a space **BS** = Back space (Delete character)

To start - Prepare the instrument

Before you use the instrument for the first time:

- Make sure that there is no damage to the instrument, and that there are no missing items.
- Remove the plastic film that protects the display. Use the tag (◗) in the top right-hand corner.
- Install the batteries (refer to B1). Then re-attach the cover.

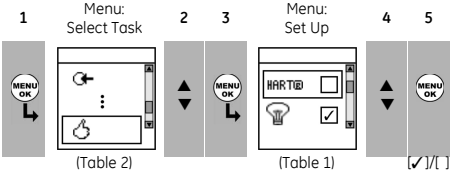
To start - Power on or off

To turn the instrument on or off, press ❍(A1 - item [1]). The instrument does a self test and then shows the applicable data.

When the power is off, the last set of configuration options stays in memory. Refer to "Maintenance".

To start - Set up the basic operation

Use the *Set Up* menu to set up the basic operation of the instrument.



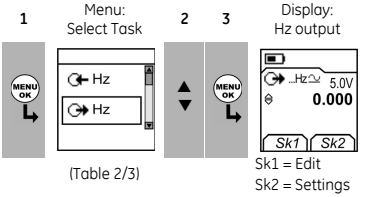
If there is additional data for a menu option, select *Settings* (■ ■) to see the values that are set up. If necessary, adjust the values.

Table 1: Menu options - Set Up

Options (If applicable)	**Description**
HART®	DPI 842 only. To add a series resistor into the mA circuit. You can then use this instrument together with a HART® communicator to set up and calibrate HART® devices.
	To select and set up the backlight facility + timer. *Additional data: Select Settings* (■ ■)
O/I	To select and set up the power off facility + timer. *Additional data: Select Settings* (■ ■)
	To show the battery level (%).
	To set the display contrast (%). ▲ Increases %, ▼ decreases %
	To set the time + date. The calibration facility uses the date to give service and calibration messages.
	To set the language option.
	To calibrate the instrument. *Additional data: Refer to "Calibration".*
	To select and show the applicable status data. (Software Build, Calibration Due date, Serial Number, IDOS Information).

To start - Select a task (Measure and/or supply)

When the instrument is set up (Table 1), use the *Select Task* menu to select the applicable task.



In Table 2/3, IDOS is a Universal Measurement Module (UMM). If you attach a UMM to the communications port (A1 - item [9]), the *Select Task* menu shows the applicable IDOS options.

Table 2: Menu options - Select Task

Options (If applicable)	**Description**
Hz or Pulses	An input measurement task: Hz - Measure the frequency Pulses - Count the number of pulses
Hz or Pulses	An output task: Hz - Supply an output frequency Pulses - Generate a specified number of pulses
mA	DPI 842 only. A mA measurement task.
mA(24V)	DPI 842 only. A mA measurement task + the loop power supply is on.
	DPI 842 only. A switch test.
IDOS	UMM only. An IDOS measurement task.
	UPM only. A leak test.
	To set up the way the instrument works. *Additional data: Refer to: Set Up* (Table 1).

Table 3 shows all the one and two function operations that are available. If you attach a UMM, you can only use the options that include IDOS.

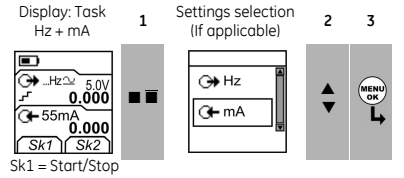
Table 3: Permitted 1 and 2 function operations

Function		Hz	Hz	Pulses	Pulses	IDOS
		(1)	(1)	(1)	(1)	(1)
mA	(1)	×	(2)	×	×	(2)
mA(24V)	(1)	×	(2)	×	×	(2)
	×	×	(2)	×	×	(2)
	×	×	×	×	×	(2)
IDOS	(1)	(2)	(2)	(2)	×	×

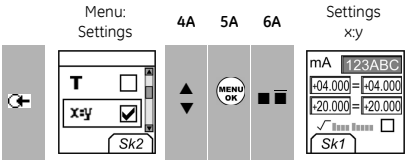
= DPI 842 only

To start - Set up the settings

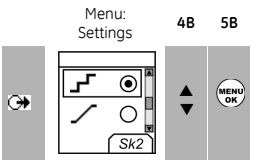
When the task is set up (Table 2/3), use the *Settings* menu to adjust the input and/or output operation.



Sk1 = Start/Stop
Sk2 = Settings



(Table 4) [✓]/[ ] Sk1 = Edit



(Table 5) [●]/[ ]

If there is additional data for a menu option, select *Settings* (■ ■) to see the values that are set up. If necessary, adjust the values. Refer to "Edit functions".

Table 4: (Part of table) Menu options - Settings (Input)

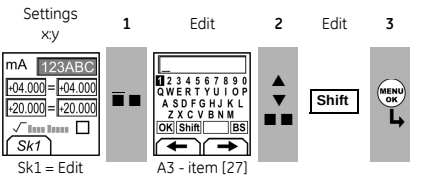
Options (If applicable)	**Description**
... Units	*Frequency Units* (Hz input only). To select one of these units: Hz: Range < 1000Hz kHz: Range 1 ... 50kHz Pulses/minute (cpm) Pulses/hour (cph)
... Units	*UPM only = "Pressure Units" if you select an IDOS task (Table 2/3). Select one of the fixed units of measurement (psi, mbar ...).*
Trigger level	To set the amplitude at which the instrument senses a frequency signal. Default = 5V. *Auto Detect* [✓]/[ ]: Set this option to make the instrument calculate the value from the available signal.
▲▼	To include maximum, minimum and average values for the measurement task.

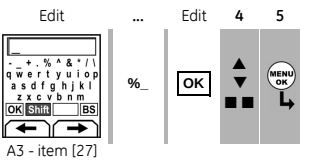
Table 4: (Part of table) Menu options - Settings (Input)

Options (If applicable)	**Description**
T	To select and set up a tare value for the measurement task (a specified value or the reading on the display). The instrument subtracts a positive tare value, and adds a negative tare value. *Additional data: Select Settings* (■ ■)
x:y	To select and set up a scale of values: One local scale for each measurement task (Maximum: 5). *Additional data (Example 1/2): Select Settings* (■ ■)
∿	To select and set up the filter values to give a smoother output for the measurement task: Band as a % of full scale (FS). The filter compares each new value with the previous value. If the new value is outside the band, it is not filtered. Low pass filter time constant in seconds. Increase the value to increase damping factor. *Additional data: Select Settings* (■ ■)
🔔	To select and set up the alarm values for the measurement task (maximum and minimum). *Additional data: Select Settings* (■ ■)
0.0	*UPM only.* Gage sensors or sensors with differential operation. A zero correction that makes the instrument read zero at local pressure.
⏱	Leak Test only. To set an applicable period for the leak test (Hours:Minutes:Seconds).

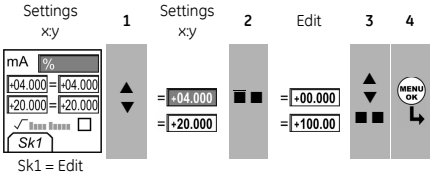
To start - Edit functions

Example 1) Set up a label for *x:y Scaling* = %.





Example 2) Set up values for *x:y Scaling* = 0 to 100%.



= *Flow scaling* (mA, pressure only)

Table 5: (Part of table) *Menu options - Settings (Output)*

Options Hz	**Description**
... Units	*Frequency Units*. To select one of these units: Hz: Range < 1000Hz kHz: Range 1 ... 50kHz Pulses/minute (cpm) Pulses/hour (cph)
Amplitude	To set the amplitude and the mode of the output signal. Amplitude = 5V (Default). *Bipolar mode* [✓]/[ ]: Set this option to make the signal pass thru zero. = Unipolar = *Bipolar*
Waveform	To set the waveform for the output signal: = Sine, square, or triangle
	To select and set up a value for the "Nudge" output. Example: 0.010 kHz increments. *Additional data: Select Settings* (■■)
	To select and set up values for the "Span Check" output. Example output cycle: 100% d d 0% This cycle repeats automatically. *Additional data* (Table 6*): Select Settings* (■■)
% Step	To select and set up values for the "% Step" output. Example output cycle: 100% s% d 0% Auto Repeat - Optional *Additional data* (Table 6*): Select Settings* (■■)

Table 5: (Part of table) Menu options - Settings (Output)

Options Hz	**Description**
... Step	To select and set up values for the "Defined Step" output. Example output cycle: 100% s 0% d Auto Repeat - Optional *Additional data* (Table 6*): Select Settings* (■■)
	To select and set up values for the "Ramp" output. Example output cycle: 100% d 0% t Auto Repeat - Optional *Additional data* (Table 6*): Select Settings* (■■)
Options Pulses	**Description**
	Counts: To set the total number of output pulses. *Rate*: To set the frequency of the output. *Amplitude*: To set the amplitude of the output signal. Amplitude = 5V (Default). *Bipolar mode* [✓]/[ ]: Set this option to make the signal pass thru zero. = Unipolar = *Bipolar*

Table 6: Additional data for Settings (Output):

Item	**Value**
Span Check	
Low (0%)	Set the 0% value.
High (100%)	Set the 100% value.
Dwell (d)	Set the period (Hours:Minutes:Seconds) between each change in value.
% Step	Low (0%), High (100%), Dwell (d): As above.
Step Size (s) ... %	Set the change in value for each step as a percentage of the full-scale range (High - Low).
Defined Step	Low (0%), High (100%), Dwell (d): As above.
Step Size (s)	Set the change in value for each step as a frequency value.
Ramp	Low (0%), High (100%), Dwell (d): As above.
Travel (t)	Set the period (Hours:Minutes:Seconds) to go from the Low (0%) value to the High (100%) value.
Auto Repeat	If applicable, select this item to repeat a cycle continuously.

Operation

This section gives examples of how to connect and use the instrument. Before you start:

- Read and understand the "Safety" section.
- Do not use a damaged instrument.

Operation - Frequency connections

To prevent instrument errors, make sure that the frequency connections (A1-item [10]) are correct.

Operation - Communications port connections

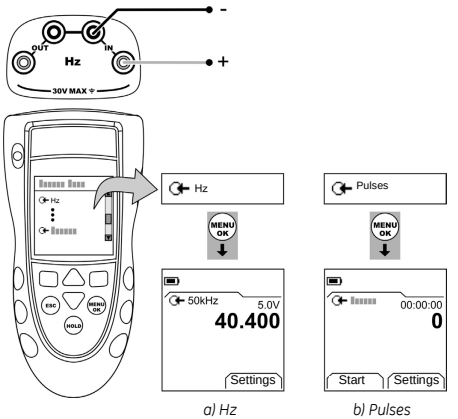
Use the communications port (A1 - item [9]) to attach an IDOS Universal Measurement Module (UMM).

When you attach the cable from a UMM (Figure 7/8), the instrument automatically changes the menus to give you all the applicable options (Table 2/3).

Operation - Measure Hz or count pulses

To measure Hz or count pulses:

1. Connect the instrument (Figure 1) and, if necessary, adjust the *Set Up* (Table 1).
2. Select a *Hz* or *Pulses* input task from *Select Task* (Table 2/3) and, if necessary, adjust the *Settings* (Table 4).
3. For *Pulses*, use *Start/Stop* (■ ■) to start and stop the count. The display shows the time (hh:mm:ss) since you started the count.



a) Hz *b) Pulses*

Figure 1: Example configuration - To measure Hz or count Pulses

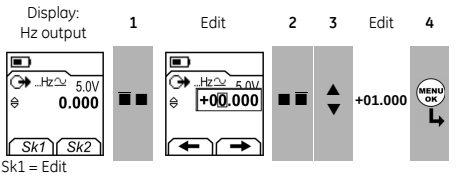
Operation - Change the output values

When the output operation is set up (Table 5), use one of these procedures to change the output values:

Table 7: Procedures to change the output

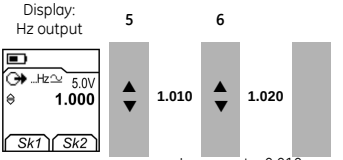
Output	Procedure
◈	Select *Edit* (■ ■) and/or use the ▲ ▼ buttons. See the example below.
100 0	Select *Start/Stop* (■ ■) or use the ▲ ▼ buttons to make the step changes manually.
Pulses	Select *Start/Stop* (■ ■).

Example procedure ("Nudge" output):



Sk1 = Edit

Sk2 = Settings



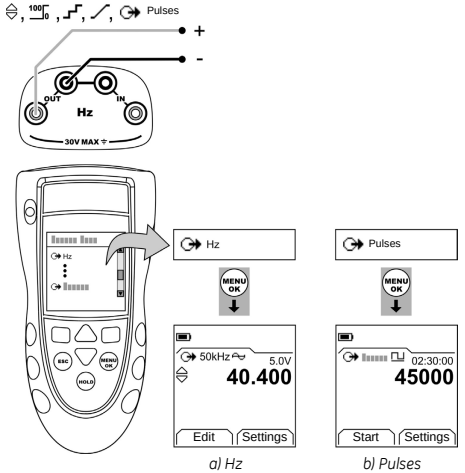
Increment = 0.010
(Table 5)

Operation - Supply Hz or pulses

To supply Hz or pulses:

1. Connect the instrument (Figure 2) and, if necessary, adjust the *Set Up* (Table 1).
2. Select a *Hz* or *Pulses* output task from *Select Task* (Table 2/3) and, if necessary, adjust the *Settings* (Table 5).

   For *Pulses*, the display shows the time (hh:mm:ss) to complete the count at the specified rate.
3. Supply the output values to the system (Table 7).



a) Hz *b) Pulses*

Figure 2: Example configuration - To supply Hz or Pulses

Operation - Transmitter calibration

DPI 842 only. To calibrate a transmitter:

1. Connect the instrument (Figure 3/4) and, if necessary, adjust the *Set Up* (Table 1).
2. Select the applicable calibration task from *Select Task* (Table 2/3) and, if necessary, adjust the *Settings* (Table 4/5).
3. Supply the output values to the system (Table 7).

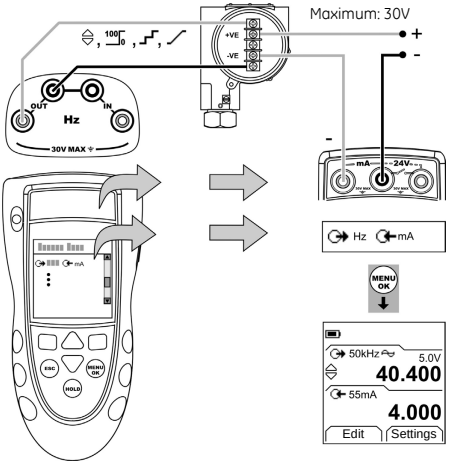


Figure 3: Example configuration - Transmitter calibration with external loop power

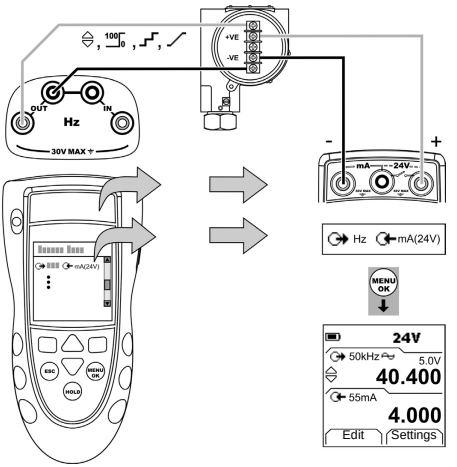


Figure 4: Example configuration - Transmitter calibration with internal loop power

Operation - mA measurements

DPI 842 only. To measure a current:

1. Connect the instrument (Figure 5) and, if necessary, adjust the *Set Up* (Table 1).
2. Select the applicable mA input task from *Select Task* (Table 2/3) and, if necessary, adjust the *Settings* (Table 4).

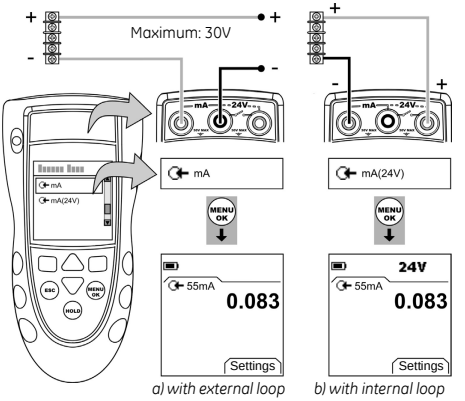


Figure 5: Example configuration - mA measurement

Operation - Switch test

DPI 842 only. To do tests on a frequency operated switch:

1. Connect the instrument (Figure 6) and, if necessary, adjust the *Set Up* (Table 1).
2. Select the applicable switch test from *Select Task* (Table 2/3) and, if necessary, adjust the *Settings* (Table 5). The display shows the switch condition (open or closed) in the top right-hand corner.
3. Supply the output values to the system (Table 7).

- Example - "Nudge" output.
  a. Use *Edit* (▀ ■) to set a value less than the switch value.
  b. Use the ▲▼ buttons to change the value in small increments.
- Example - "Ramp" output.
  a. Set "High" and "Low" values that are applicable to the switch value (Table 6). Then, to get an accurate switch value, set a long "Travel" period.
  b. Use *Start/Stop* (▀ ■) to start and stop the "Ramp" cycle.

4. If necessary, supply the output values in the opposite direction until the switch changes condition again.

   The display shows the applicable values to open and close the switch.

5. To do the test again, press **ESC** to reset the values.

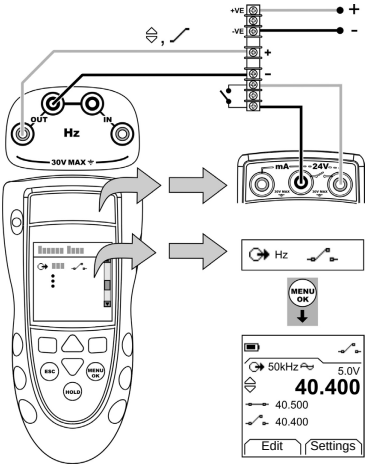
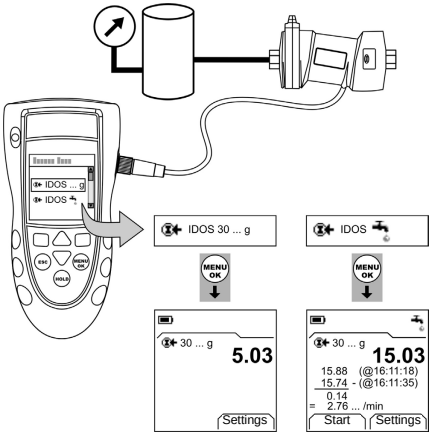


Figure 6: Example configuration - Switch test

Operation - UPM Pressure measurements

Read all the instructions supplied with the UPM and then use the specified procedures to connect it (Figure 7/8).



a) Pressure *b) Leak test*

Figure 7: Example configuration - Pressure measurement with a UPM

When the connections are complete, make the necessary IDOS selections (Table 2/3).

If you re-attach a UPM, the instrument uses the same measurement units that you used before. The instrument keeps a record for the last 10 modules.

UPM - Measure the pressure

To measure the pressure (Figure 7):

1. Select the applicable pressure task from *Select Task* (Table 2/3) and, if necessary, adjust the *Set Up* (Table 1), and the *Settings* (Table 4/5).
2. If necessary, do a zero correction (Table 4).

To measure pressure with another operation (Figure 8), use the same procedure.

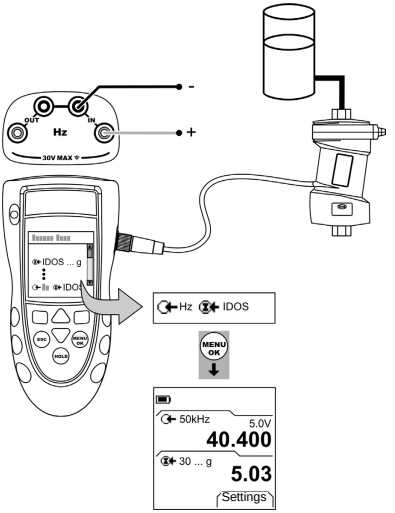


Figure 8: Example configuration - To measure pressure and frequency

UPM - Leak test

To do a leak test on a pressure system (Figure 7):

1. Select an applicable leak test from *Select Task* (Table 2/3) and, if necessary, adjust the *Set Up* (Table 1), and the *Settings* (Table 4).
2. Set the period for the leak test (Table 4).
3. If necessary, do a zero correction (Table 4).
4. To start the leak test, select Start (■■). When the test is finished, the instrument calculates the leak rate in the applicable units/minute.

Operation - Error indications

If the display shows <<<< or >>>> :

- Make sure that the range is correct.
- Make sure that all the related equipment and connections are serviceable.

Maintenance

This section gives procedures to maintain the unit in a good condition. Return the instrument to the supplier for all repairs.

Maintenance – Clean the unit

Clean the case with a moist, lint-free cloth and a weak detergent. Do not use solvents or abrasive materials.

Maintenance – Replace the batteries **B1**

To replace the batteries, refer to B1. Then re-attach the cover.

Make sure that the time and date are correct. The calibration facility uses the date to give service and calibration messages.

All the other configuration options stay in memory.

Calibration

Note: GE can provide a calibration service that is traceable to international standards.

We recommend that you return the instrument to the manufacturer or an approved service agent for calibration.

If you use an alternative calibration facility, make sure that it uses these standards.

Calibration - Before you start

To do an accurate calibration, you must have:

- the calibration equipment specified in Table 8.
- a stable temperature environment: 70 ± 2°F (21 ± 1°C)

Table 8: Calibration equipment

Function	**Calibration equipment** (ppm = parts per million)
Hz	1) Frequency meter Total error: 7 ppm or better Resolution: 8 digits (minimum) 2) Signal generator
Pressure	UPM only. Refer to the user manual for the IDOS UPM.
mA	mA calibrator. Accuracy: Refer to Table 11.
Amplitude (V)	1) Frequency meter Total error: 7 ppm or better Resolution: 8 digits (minimum) 2) Digital volt meter (DVM)

Before you start the calibration, make sure that the time and date on the instrument are correct (Table 1).

Selection sequence:

➤ *Select Task* (Table 2) ➤ *Set Up* (Table 1) ➤ *Calibration* ➤.

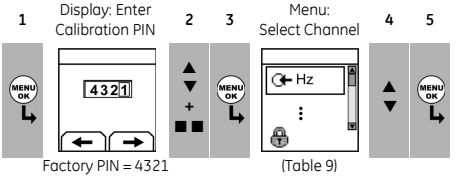


Table 9: Calibration options

Options	**Description**
Hz	To calibrate the input or output frequency.
...	*Amplitude*. To select and calibrate the output amplitude for the *Square Wave* and then the *Sine/Triangular Wave*.
IDOS ...	UMM only. To calibrate the specified IDOS UMM. Refer to the user manual for the IDOS UMM.
mA	DPI 842 only. To calibrate the mA input.
	Calibration Due: To set the date of the next calibration for the instrument. After the specified calibration date, there is a warning message. There is a selection box to stop the warning.
	To change the calibration PIN (Personal Identification Number).

When you select a channel, the display shows the applicable instructions to complete the calibration.

When the calibration is complete, select *Calibration Due* and set the new calibration date for the instrument.

Calibration - Procedures (Hz - input/output)

1. Connect the instrument to the calibration equipment (Figure 1).
2. Let the equipment get to a stable temperature (minimum: 5 minutes since the last power on).
3. Set up the equipment with these conditions:

Frequency meter:	Gate time = one second
Signal generator:	Output = 10V, unipolar, square wave
	Frequency = 990 Hz
DPI 841/842:	Input units = Hz (Table 4)
	Input trigger level = 5V (Table 4)

4. Use the calibration menu (Table 9) to do the calibration. The display shows the applicable instructions to complete the calibration.

5. To make sure that the calibration is correct, set up the equipment to do one of these calibration checks:

- Hz input calibration check (Figure 1):

  Frequency meter: Gate time = one second
  Signal generator: Output = 10V, unipolar, square wave
  DPI 841/842: Input trigger level = 5V (Table 4)
  Units (Table 4): Hz or kHz as specified in Table 10.

- Hz output calibration check (Figure 2):

  Frequency meter: Gate time = one second
  DPI 841/842: Units (Table 5): Hz or kHz as specified in Table 10.

6. Measure or supply the specified values (Table 10): Hz then kHz. Make sure that the error is in the specified limits.

Table 10: Hz error limits (Measure/Supply)

Measure/ Supply	Permitted DPI 841/842 error (Hz)		Measure/ Supply	Permitted DPI 841/842 error (kHz)	
Hz	⟵	⟶	kHz	⟵	⟶
25	0.002	0.0014	2.5000	0.0002	0.000042
100	0.002	0.0021	10.0000	0.0002	0.000112
250	0.004	0.0035	20.0000	0.0003	0.000205
500	0.006	0.0058	30.0000	0.0004	0.000298
990	0.011	0.0104	50.0000	0.0006	0.000483

Calibration - Procedures (mA input)

1. DPI 842 only. Connect the instrument to the calibration equipment (Figure 5).
2. Let the equipment get to a stable temperature (minimum: 5 minutes since the last power on).
3. Use the calibration menu (Table 9) to do a three-point calibration (-FS, Zero and +FS). The display shows the applicable instructions to complete the calibration.
4. To make sure that the calibration is correct, select the applicable mA input task (Table 2) and apply these values:

- mA: -55, -40, -24, -18, -12, -6, 0 (short circuit)
  Then mA: 0, 6, 12, 18, 24, 40, 55.

5. Make sure that the error is in the specified limits (Table 11).

Table 11: mA input error limits

Applied mA	Calibrator error (mA)	Permitted DPI 841/842 error (mA)
±55	0.0022	0.005
±40	0.0018	0.004
±24	0.0014	0.003
±18	0.0004	0.003
±12	0.0003	0.002
±6	0.0002	0.002
0 (Short circuit)	-	0.001

Calibration - Procedures (Amplitude output)

1. Connect the instrument to the calibration equipment (Figure 2).
2. Let the equipment get to a stable temperature (minimum: 5 minutes since the last power on).
3. Set up the DPI 841/842 with these conditions:

   Output Hz = 0 (For direct current output)
   Output amplitude: Set to Unipolar (Table 5)
   Output waveform = *Square Wave* (Table 5)

4. Use the calibration menu (Table 9) to do the *Square Wave* calibration. The display shows the applicable instructions to complete the calibration.

   Calibration values: Low = 0.1V, High = 20V

5. Change the output waveform to *Sine Wave* (Table 5).
6. Use the calibration menu (Table 9) to do the *Sine/Triangular Wave* calibration. The display shows the applicable instructions to complete the calibration.

   Calibration values: Low = 0.1V, High = 20V

7. To make sure that the calibration is correct, set up the DPI 841/842 with these conditions:

   Output Hz = 0 (For direct current output)

   Output amplitude: Set to Unipolar (Table 5)

8. Supply the specified values (Table 12): *Square Wave* then *Sine Wave*. Make sure that the error is in the specified limits.

Table 12: Amplitude output error limits

Amplitude Volts (V)	**Permitted DPI 841/842 error (V)**
0.1	0.05
1.0	0.10
10.0	0.10
15.0	0.15
24.0	0.24

Calibration - Procedures (IDOS UMM)

Refer to the user manual for the IDOS UMM.

When the calibration is complete, the instrument automatically sets a new calibration date in the UMM.

Specification data

All accuracy statements are for one year.

Specification - General

Languages	English [Default]
Operating temperature	14 ... 122°F (-10 ... 50°C)
Storage temperature	-4 ... 158°F (-20 ... 70°C)
Humidity	0 to 90% without condensation (Def Stan 66-31, 8.6 cat III)
Shock/Vibration	BS EN 61010:2001; Def Stan 66-31, 8.4 cat III
EMC	BS EN 61326-1:1998 + A2:2001
Safety	Electrical - BS EN 61010:2001; CE Marked
Size (L: W: H)	7.1 x 3.3 x 2.0 in (180 x 85 x 50 mm)
Weight	14 oz (400 g)
Power supply	3 x AA alkaline batteries
Duration (Measure)	Hz, pulses: ≈ 60 hours mA: ≈ 35 hours
Duration (Supply)	Hz, pulses: ≈ 20 hours mA: ≈ 10 hours (24 V Source at 12 mA)

Specification - Frequency

cpm = Pulses/minute, cph = Pulses/hour

Range (Measure):	**Accuracy:**
0 ... 999.999 Hz 1 ... 50.0000 kHz cpm: 0 ... 99999 cph: 0 ... 99999	For all the ranges: 0.003% of reading + 2 counts

Range (Supply):	**Accuracy:**
0 ... 999.99 Hz	0.003% of reading + 0.0023 Hz
1 ... 50.000 kHz	0.003% of reading + 0.0336 Hz
cpm: 0 ... 99999	0.003% of reading + 0.138 cpm
cph: 0 ... 99999	0.003% of reading + 0.5 cph

Temperature coefficient 14 ... 50°F, 86 ... 122°F (-10 ... 10°C, 30 ... 50°C)	 0.0011% FS / °F (0.002% FS / °C)
Waveform (Sine, square, triangle)	Unipolar Bipolar
Voltage input	0 ... 30 V
Trigger level	0 ... 24 V, Resolution: 0.1 V
Output amplitude	0 ... 24 V dc ± 1%
	0 ... 24 V ac ± 5% (Current ≤ 20 mA)
Connectors (A1 - Item 10)	Four 0.16 in (4 mm) sockets

Specification - Electrical connectors (A2)

Range (Measure)	0 to ±55 mA
Accuracy	0.02% of reading + 3 counts
Temperature coefficient 14 ... 50°F, 86 ... 122°F (-10 ... 10°C, 30 ... 50°C)	 0.0011% FS / °F (0.002% FS / °C)
Switch detection	Open and closed. 2 mA current.
Loop power output	24 V ± 10%
HART® resistor	250 Ω (menu selection)
Connectors (A2)	Three 0.16 in (4 mm) sockets